



Fire and Emergency Services (FES) Commissioner's
Operational Requirement Guideline (ORG)

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Authorised: Superintendent Built Environment Branch

ORG 10: Fire Compartmentation/Separation/Structural Integrity

1. Intent

Buildings must be designed and constructed in a manner that will allow firefighters time to safely reach the area of fire origin, search the general area of fire origin and protect their means of egress before conditions become untenable.

2. Operational Requirement

The FES Commissioner requires the following:

- i. National Construction Code (NCC) requirements related to building construction, including internal linings and external walls must be installed as a minimum,
- ii. the building must be designed to retain its structural integrity for the complete duration of a fire including cooling to ambient temperature,
- iii. a quantitative analysis (must be conducted to demonstrate suitability of a building's structural design when a performance based approach to fire compartmentation/separation/structural integrity is undertaken. Factors to be considered include:
 - a. the fire severity and location/(s),
 - b. any automatic fire sprinkler systems,
 - c. any other active fire safety systems (including ventilation) that affect the fire severity and its impact on structural stability, and
 - d. the likelihood and consequence of failure of any fire safety systems that affect the fire severity and its impact on structural stability.
- iv. when a performance based approach is undertaken the structural stability of the building must always be confirmed in writing by a suitably qualified structural engineer,
- v. additional resilience should be provided/considered for the structural elements, fire safety systems and firefighting facilities that are critical to maintaining the integrity of the building. I.e. the number and/or reliability factors of the systems critical for maintaining the fire safety design,
- vi. external walls of construction type A and B buildings must demonstrate non-combustibility through Australian Standard 1530.1 or the NCC verification method CV3.

Consultation with the DFES Built Environment Branch is required for any deviations from the points above or if clarification is required.

3. Reason

If firefighters cannot enter a building they cannot suppress the fire effectively and cannot search and rescue those trapped inside.

Designers should adopt building designs with appropriately considered safety margins and safety system redundancies that ensure effectiveness, reliability and resilience of the installed fire safety systems and the building's fire safety strategy.

Increasingly there are new and various construction methods and building features that may have an impact on fire, smoke and heat movement through a fire compartment and building. Increased escape times and complexity around firefighting operations for large or tall buildings mean there is an increased reliance on the effectiveness and resilience of the building's passive and active fire safety systems. Consequential collapse of elements not required for structural stability must also not compromise occupant safety or firefighting access. For example, tall building fires across the world have highlighted the vulnerability of rapid external fire spread resulting from poor choices of external cladding.

Where there is a lack of adequate fire separation and structural stability in a building, a fire can quickly grow to a size where it spreads fire, smoke and heat and reduces the time available for occupants to escape safely and for firefighters to enter the building and conduct firefighting operations.

4. Risk Management

DFES defines risk as: 'The threat that an event or activity adversely affects our ability to achieve business and operational objectives or the failure to exploit opportunities to maximise stakeholder value.'

In the event of a building fire, there is an extreme risk that the provision of a poorly designed and constructed building will:

- i. allow unnecessary spread of fire through additional fire compartments of a building,
- ii. present limitations on the ability of firefighters to access the location of the fire or trapped occupants,
- iii. inhibit the ability of occupants to access escape routes,
- iv. cause injury and death to occupants and/or firefighters.

The FES Commissioner's Operational Requirements are designed to help manage the risk.

5. Resources

Additional DFES fire compartment/separation/structural Integrity information for building owners, authorities having jurisdiction and fire safety practitioners is available in DFES technical notes and operational requirement documents:

<https://www.dfes.wa.gov.au/regulationandcompliance/buildingplanassessment/pages/publications.aspx>

6. References

DFES Enterprise Risk Management Procedure (2018) Version1, Enterprise Risk.

National Construction Code Series (as amended) Volume One Building Code of Australia 'Class 2 to 9 Buildings', Australian Building Codes Board, ACT, Australia.